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L.R. Sprott

G.H. Kiracofe

L.R. Corah

See next page for additional authors

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Abstract

Rumensin increased the number of heifers cycling at 394 days of age and tended to decrease the weight at puberty, with no effect on conception or pregnancy. Rumensin also increased average daily gain, total weight change, and feed efficiency. Protein level had no direct effect on reproductive or heifer performance. Heifers on higher energy rations tended to cycle s09ner and be younger and lighter at puberty. Higher energy rations caused faster daily gain, more total weight change, and better feed efficiency. Post-weaning sickness had no effect on reproductive performance or growth.

Keywords

Cattlemen's Day, 1980; Report of progress (Kansas State University. Agricultural Experiment Station); 377; Beef; Protein; Energy; Post-weaning; Reproductive performance; Replacement heifers

Authors

L.R. Sprott, G.H. Kiracofe, L.R. Corah, and Jack G. Riley

The Effects of Rumensin[1], Protein, Energy, and Post-weaning Illness on Reproductive Performance in Replacement Heifers

L. R. Sprott, G. H. Kiracofe, L. R. Corah, and J. Riley

Summary

Rumensin increased the number of heifers cycling at 394 days of age and tended to decrease the weight at puberty, with no effect on conception or pregnancy. Rumensin also increased average daily gain, total weight change, and feed efficiency. Protein level had no direct effect on reproductive or heifer performance. Heifers on higher energy rations tended to cycle sooner and be younger and lighter at puberty. Higher energy rations caused faster daily gain, more total weight change, and better feed efficiency. Post-weaning sickness had no effect on reproductive performance or growth.

Introduction

Recent work at Kansas State and Texas A & M indicates that Rumensin decreases the age and weight at puberty in beef heifers with no effect on conception rates. Energy and protein levels of replacement heifers affect both the onset of puberty and conception. The purposes of this study were to determine the effects of Rumensin, energy, and protein level on time to puberty and conception rates in beef replacement heifers. We attempted to determine any interactions between Rumensin and energy and protein levels. Data were also collected concerning effects of post-weaning sickness on reproductive and feedlot performance.

Procedure

After a 30-day adjustment period in the dry lot, 168 Angus and Angus x Hereford heifers were allotted by weight, age, and breed to one of four treatments shown in table 6.1. Half of each treatment received 200 mg Rumensin per head per day.

To determine the onset of puberty (first standing estrus), twice-daily estrus checks were initiated on the day the heifers arrived at the drylot and maintained through the breeding season. From May 20 to July 18, heifers were artificially inseminated by one technician using semen from a single ejaculation.

Results and Discussion

There were no statistical interactions between Rumensin and energy and protein levels in the diet. Table 6.2 shows that Rumensin tended to de-

[1]Rumensin is a product of Elanco Products Company, Indianapolis, IN 46206.

crease the age and weight at puberty (P>.05). Rumensin increased the percentage of heifers cycling by 394 days of age (P<.05), and there was a similar trend prior to that time. By 434 days of age, there was no difference in number of heifers cycling. There was no difference in first service conception rates, but pregnancy rates 60 days after breeding tended to be lower in Rumensin heifers. Only the number of heifers cycling at 394 days was statistically different. Average daily gain and total weight change were higher (P<.05) in Rumensin heifers. Consequently, Rumensin heifers gained more on less feed.

Protein level had no effect on age and weight at puberty. Heifers on 8.85 lb TDN per head per day tended to be younger and lighter at puberty (table 6.3). There was a tendency towards more cycling heifers in the higher energy groups. Protein and energy had no effect on first service conception or pregnancy rates. However, heifers on the higher energy rations gained faster (P<.05) and, consequently, had better feed efficiency than heifers on the low protein-low energy ration.

Table 6.4 shows that post-weaning sickness had no effect on age and weight at puberty. There was a tendency (not statistically significant) towards higher conception and pregnancy rates in heifers having no illness periods. A non-significant trend towards higher daily gain, total weight change, and better feed efficiency was seen in heifers that had no illness or only one illness period. However, post-weaning sickness had no effect on reproductive performance or gain.

Table 6.1. Number of cattle per treatment.

	11.1% crude protein (1.50 lb/hd/day)	12.7% crude protein (1.73 lb/hd/day)	14.6% crude protein (1.99 lb/hd/day)
High energy 8.85 lb TDN/hd/day	42 head	42 head	42 head
Low energy 8.30 lb TDN/hd/day	42 head	-----	-----

Table 6.2. Effects of Rumensin on heifer gains and reproductive performance.

	Rumensin	No rumensin
Average days of age at weaning (start of treatment)	214.0	210.6
Average days of age at puberty	356.7	367.5
Average weight at puberty (lbs)	611.0	631.8
Percent cycling by days of age:		
234	5	8
314	24	17
394	67[a]	46[b]
(start of breeding) 434	94	93
Percent first service conception	69.5	70.4
Percent pregnant 60 days after breeding	80.5	87.6
Average daily gain (lbs)	1.48[a]	1.38[b]
Total weight change after 278 days (lbs)	411.8[a]	385.0[b]
Feed efficiency (lbs of dry matter/lb of gain)	9.2[a]	10.1[b]

[a,b]Values in the same row with different superscripts differ significantly (P<.05).

Table 6.3. Effects of protein and energy on heifer gains and reproductive performance.

	11.1% crude protein		12.7% crude protein	14.6% crude protein
Energy level	8.30 lb TDN per head per day	8.85 lb TDN per head per day	8.85 lb TDN per head per day	8.85 lb TDN per head per day
Average days of age at weaning (start of treatment)	212.3	211.1	211.0	214.8
Average days of age at puberty	372.0	358.0	351.4	367.0
Average weight at puberty (lbs)	628.0	617.5	609.0	631.0
Percent cycling by days of age:				
234	5	7	7	7
314	17	24	26	14
394	46	64	62	58
(start of breeding) 434	93	90	95	97
Percent first service conception	72	67	68	73
Percent pregnant after 60 days of breeding	85	81	83	88
Average daily gain (lbs)	1.28[a]	1.42[b]	1.41[b]	1.42[b]
Total weight change (lbs) after 278 days	366.9[a]	400.3[b]	392.0[b]	394.8[b]
Feed efficiency (lbs of dry matter per lb of gain)	11.18[a]	9.6[b]	9.8[b]	9.7[b]

[a,b]Values in the same row with different superscripts differ significantly (P<.05).

Table 6.4. Effect of sickness on heifer gains and reproductive performance.

	Illness periods		
	0	1	>1
No. of heifers	89	66	13
Avg. age at puberty (days)	338.0	344.4	342.8
Avg. weight at puberty (lb)	599.9	601.9	578.2
Percent first service conception	72	69	61
Percent pregnant 60 days after breeding	83	80	76
Avg. daily gain (lb)	1.40	1.45	1.35
Total weight change (lb)	391.4	403.3	376.5
Feed efficiency (lbs of dry matter per lb of gain)	9.7	9.4	10.0